

31 Dec 2000

From: Commanding Officer, NRL S&T 510, Houston, TX
To: Commanding Officer, Naval Research Laboratory
Subj: NRL S&T 510 FY 2001 FIRST QUARTER UNIT REPORT

1. This letter forwards my FY 2001 First Quarter Report, which contains information summarizing the Peacetime Contributory Support (PCS) activities of NRL S&T 510 during the period from 1 October 2000 through 31 December 2000.
2. The report is formatted in MS word with links providing direct access to specific accomplishments from the summary tables. Click on a project name for supporting information. The blue back arrow in your web toolbar provides a return path to the table.
3. Unit member biographies, including contact information, may be found on the web at <http://www.onr.navy.mil/reserves/units/st510>.
4. AT/ADSW/IDTT Highlights:
 - a. On 2 and 3 December, conducted a unit IDTT at NASA's Johnson Space Center, coordinated by CDR Patricia Jaklitch. Received in-depth tour of the X-38 Crew Return Vehicle flight control instrument simulation lab, including an explanation of the simulation equipment, data networks, and project goals. Participated in seminars led by astronaut training personnel on a number of space shuttle guidance and control systems.
 - b. LCDR Richard Kottke completed 12 hours of incremental drill and a two-day IDTT 14 & 15 December at Naval Research Laboratory, Monterey, CA, where he completed phase one of the TEDS to JMCIS project. See project description for his [accomplishments](#).
 - c. LT Len Yowell completed 9 hours of work as defined in his research proposal: "Synthesis and Characterization of an Alumina/Carbon Nanotube Composite by Extrusion". See project description for his [accomplishments](#).
 - d. LCDR John E. M. Brown completed a 48 hours of incremental drills and a 12-day AT from 18 December through 29 December at NRL Monterey to validate satellite sea surface temperature measurement methods and develop training materials for satellite scatterometry. See project description for his [accomplishments](#).
 - e. LCDR Mary York completed 8 hours of incremental drills working on the Research Psychologist Web Site project for ONR code 341. See project description for her [accomplishments](#).

f. CDR George Spencer completed a twelve-day AT at the Naval Research Laboratory, Washington from 11 December to 22 December. He conducted bench tests on additives for fuel system icing inhibitor to solve a shelf life problem, evaluated handheld conductivity meters for use as free water in fuel detectors, and conducted high temperature oxidation tests to evaluate soybean-derived synthetic fuel oil as an military diesel fuel blending agent. See project descriptions for his [accomplishments](#).

4. CAPT Gregory C. Johnson has been relieved as Commanding Officer of NRL S&T 510 by CAPT Scott Pursley.

/s/ S. Pursley

Electronic copy to:
Commanding Officer, N&MCRC, Naval District Washington
Director, S&T Reserve Program (ONR Code 45)
Reserve Program 38 Commanding Officers
NRL S&T 510 Members

I. NRL S&T 510 PEACETIME CONTRIBUTORY SUPPORT

Project Title: **Remote Sensor Agreement in Ocean-Color Analysis**

Reserve Project Team: LT John A. Thomasson, NRL S&T 510

Project Customer: Remote Sensing Branch, Ocean Color Group, NRL Code 7343

Accomplishments:

No activity this quarter.

Project Title: **Chesapeake Bay Outflow Plume Experiment I (COPE I)**

Reserve Project Team: LCDR John E. M. Brown, NRL S&T 510

Project Customer: Dr. Bob Arnone, Multi-spectral Sensing and Applications division, NRL Code 7343

Accomplishments:

No activity this quarter.

Project Title: **Research Psychologist Web Site**

Reserve Project Team: LCDR Mary J. York, NRL S&T 510

Project Customer: CDR Stephen Ahlers, ONR Code 341

Accomplishments:

- 1) Requested authorship privileges for the web site. Reviewed current web site and drafted preliminary recommendations for web redesign.

Project Title: **Geospatial Information DataBase (GIDB)**

Reserve Project Team: LCDR Craig M. Cobb, NRL S&T 510

Project Customer: Kevin Shaw, NRL Stennis, Code 7440.2 (Mapping Charting and Geodesy)

Accomplishments:

No activity this quarter.

Project Title: **TechOASIS**

Reserve Project Team: CDR Patricia Jaklitch, NRL S&T 510

Project Customer: CAPT Ryan, London IFO

Accomplishments:

No activity this quarter

Project Title: **Northern Gulf of Mexico Littoral Initiative (NGLI)**

Reserve Project Team: LCDR Craig M. Cobb, NRL S&T 510

Project Customer: Naval Oceanographic Office (Scientific Technology Staff, Code OTT)

Chief Scientist: Carl Szczechowski

Accomplishments:

No activity this quarter

Project Title: **Regional Naval Science Awards Program Support**

Reserve Project Team: CAPT Robert C. Trevino, NRL S&T 510

Project Customer: Bruce Thompson, Public Affairs Division, ONR Code 353

Accomplishments:

No activity this quarter.

Project Title: **Acoustic Seafloor Classification Profiler (ASCP)**

Reserve Project Team: CDR RJ Rusnak, NRL S&T 510

Project Customer: Dale Bibee, NRL Stennis, Code 7430

Accomplishments:

No activity this quarter

Project Title: AVHRR Satellite Imagery Processing

Reserve Project Team: LCDR John E. M. Brown, NRL S&T 510

Project Customer: Satellite Meteorology Branch, NRL Monterey, Code 7541

Additional Information:

<http://kauai.nrlmry.navy.mil/training-bin/training>

(choose Marine Winds and Waves Validation)

Accomplishments:

- 1) Using NRL Monterey's satellite training 'Composer' software LCDR Brown developed six online tutorials for the NRL Monterey Products Training web site. Under the heading of Marine Winds and Waves Validation, these online tutorials provide a description of satellite scatterometry and radar altimetry data and their use in the forecasting cycle of Naval meteorological and oceanographic products
- 2) LCDR Brown also completed 48 hours of incremental drill aboard the USCGC Polar Sea (WAGB-11) collecting AVHRR satellite imagery and ancillary meteorological data for validation studies of satellite sea surface temperature algorithm.

Project Title: TEDS to JMCIS

Reserve Project Team: LCDR Richard J. Kottke, NRL S&T 510

Project Customer: Larry Phegely, NRL Monterey

Additional Information on TEDS:

<http://www.nrlmry.navy.mil/~lande/TEDS>

Accomplishments:

- 1) During incremental drill periods developed software to simulate the motion of a “dummy” ship and generate periodic position reports in GOLD format. Ship’s starting and ending point and speed of progress are user-selectable via a configuration file.
- 2) During two-day IDTT at NRL Monterey, ported the software from Mac OS to HP-UX for use on NRL’s lab computer. Assisted lab personnel at the NRL visualization lab in establishing a serial data link between two test computers. Used the serial data link to test and debug the software by sending GOLD format contact reports from the computer running the dummy ship software to the computer running JMCIS (GCCS-M). Familiarized lab personnel with aspects of contact database management in JMCIS.
- 3) Conducted familiarization on the JMCIS application programming interface (API) and developed a version of the ship simulation program that operated as part of the JMCIS package.

II. NAVAL RESERVE ACTIVE DUTY SUPPORT TO NRL WASHINGTON, D.C.

Project Title: Thruster Engine Characteristics for the Dynamic Motion Simulation

Reserve Project Team: LT Andy Hamilton, NRL S&T 510

Project Customer: Sam Hollander, NRL Washington D.C. (Code 8230). Robotics Engineering and Controls Laboratory of the Spacecraft Engineering Department for the Naval Center for Space Technology

Accomplishments:

No activity this quarter.

Project Title: Deep Sea Corrosion Research

Reserve Project Team: CDR AJ Murphy, NRL S&T 510

Project Customer: NRL Code 6136

Accomplishments:

No activity this quarter.

Project Title: Security Support

Reserve Project Team: LCDR Mary York, NRL S&T 510

Project Customer: Information Systems Security Section, NRL Washington, Code 1220

Accomplishments:

No activity this quarter.

Project Title: Soybean-Derived Synthetic Fuel Oil as a Military Diesel Fuel Additive

Reserve Project Team: CDR George Spencer, NRL S&T 510

Project Customer: Dr. Dennis Hardy, NRL Washington, code 6121

Accomplishments:

- 1) Completed one week of ASTM D5304 high temperature stability tests on commercial home heating oil samples to which synthetic diesel fuel ("Soy Gold") had been blended at 10% and 20% per volume. Prior to blending the home heating oil had been stressed with water/acid and water/base to represent probable "real world" stress conditions on the fuel.
- 2) Analyzed the test results, which showed that Soy Gold did in fact significantly improve the shelf life of #2 heating oil when blended 10% by volume. In some cases a tenfold improvement was noted. Soy Gold is worthy of future study as a possible blending agent to convert heating oil into a military grade diesel fuel, such as F-76.

Project Title: Test Additives to Reduce Fuel System Icing Inhibitor's Hygroscopic Behavior

Reserve Project Team: CDR George Spencer, NRL S&T 510

Project Customer: Dr. Dennis Hardy, NRL Washington, code 6121

Accomplishments:

- 1) Conducted bench tests on numerous blending agents for Diethylene Glycol Monomethylether, attempting to moderate this fuel system icing inhibitor (FSII)'s extreme hygroscopic behavior. Currently the shelf life of an open container of FSII is less than one day, due to the large amount of water it absorbs from ambient air. This causes the Navy to waste thousands of gallons of additive per year.
- 2) Analysis of the samples after blending with a number of different additives showed that some of the additives could extend the shelf life of an open container of FSII by a factor of two. Further study is required before modifying the current FSII specifications, however this method shows that improvements in this current Navy problem are possible.

Project Title: Evaluation of Handheld Conductivity-Type Free Water in Fuel Analyzers for Field Use

Reserve Project Team: CDR George Spencer, NRL S&T 510

Project Customer: Dr. Dennis Hardy, NRL Washington, code 6121

Accomplishments:

- 1) Conducted evaluation tests of hand-held conductivity meters for suitability as free water analyzers for use in the field.
- 2) Evaluated several different techniques for using a handheld conductivity meter to measure free water in military aviation fuel.
- 3) Analyzed test results and concluded that although the theory is valid, the sensitivity of currently available hand-held devices is not fine enough to detect free water in the levels usually present in JP-5 or JP-8. No further investigation of this instrument is warranted.

Project Title: Synthesis and Characterization of an Alumina/Carbon Nanotube Composite by Extrusion

Reserve Project Team: LT Leonard Yowell, NRL S&T 510

Project Customer: Dr. M. A. Imam, NRL Washington, code 6320

Accomplishments:

- 1) Conducted research (literature search) into various processing routes for an extrudable alumina slurry and selected a few promising techniques.
- 2) Established contact and began an informal collaboration with ceramists in academia (Rutgers) and industry (Reynolds Metal Co. and Shamrock Technologies) with experience in extrudable ceramic systems.
- 3) Procured starting materials (alumina, binder, plasticizer, and lubricant) for processing of extrudable alumina.
- 4) Purified ten grams of Vapor Grown Carbon Fibers (VGCFs) for initial alumina / nanotube composite fiber experiments.

III. NON-NSAP/NRL PROJECT SUPPORT

Project Title: National Society of Hispanic Physicists

Reserve Project Team: LT Leonard Yowell, NRL S&T 510

Accomplishments:

- 1) Represented ONR and NRL at the fall meeting of the National Society of Hispanic Physicists at Rice University on October 28th, 2000.